

Building the Ultimate Professional Computer

The Eureka PC Build Guide

The step-by-step process to build a professional PC.

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<http://eureka123.com>

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How to Gently Overclock an Intel i7 Processor

How to Design and Build a Low Cost Green PC

How to Tune Up a Computer for High Performance

How to Completely Remove All Viruses and Block Infections

I. Overview

For typical computing, the optimal choice is a Dell or an iMac. This is what we recommend for many of our business colleagues, friends, and family.

By contrast, we designed the Ultimate Professional Computer for traders, investors, executives, authors, inventors, recording artists, engineers, graphic artists, application developers, creatives, scientists, architects, and other professionals who want the best in silent computing technology.

The design has been refined over several years of real world experience in the IT departments of Fortune 100 companies. It is in a cycle of continuous improvement and changes periodically.

Using best-in-class components, our build process creates the quietest, fastest, coolest running, and most reliable computer of its kind in the world, a perfectly integrated system. Each component has been thoughtfully selected based on practical experience in the most demanding professional environments. The process that follows is tailored to specific components; however, it can be followed at a high level to build any PC.

II. The 7 Steps of the Eureka Build Process

STEP 1: Order Best-in-Class Parts

Check the Ultimate Professional Computer page of the Eureka website for the latest version of the parts specification:

<http://eureka123.com/computer-repair-services-ultimate-computer.html>

For best results, order the *exact* parts specified. Parts can be ordered from any reliable supplier.

STEP 2: Assemble System

Tools needed: long Phillips #2 screw driver, ¼” hex head driver, small black zip ties, flashlight, black electrical tape, small wire cutters, scissors, coffee filters.

- 1) Unpack APC UPS and place in its final destination.
- 2) Read APC UPS manual.**
- 3) Plug UPS power cord into UPS and into wall socket with dedicated 15 Amp circuit. Let it charge. UPS is **only** for PC, monitors, router, internet modem, and phone, but don't plug them in yet. Printers and fax machines overload a UPS.
- 4) Put all PC component boxes on a large work space under good light.
- 5) Discharge any static electricity from your person – touch metal, dampen hair. Don't wear wool, polyester, or silk. Don't assemble while standing on carpet.
- 6) Wash and dry hands to remove any oil from fingertips.
- 7) Unpack Antec Solo case.
- 8) Read Antec case manual.
- 9) Thread 9 brass standoffs into case in ATX pattern according to Antec instructions. Some may already be in place. Remove any standoffs in non-ATX positions.
- 10) Bolt Seasonic power supply into case according to Antec instructions.
- 11) Attach Antec-supplied rails onto optical drive and install drive in top bay of case.
- 12) Attach Intel-supplied tray onto SSD drive. Install SSD drive in lower drive bay of case.
- 13) Remove existing case fan and replace with Nexus **black-and-white** case fan. Use screws from old fan instead of the four black rubber fasteners. Align arrow to blow air out of case.
- 14) Unpack Asus motherboard and place on cardboard/foam from package to protect back pins.
- 15) Read Asus motherboard manual. This is the most informative manual.**

16) Remove generic silver I/O shield from Antec case and replace with Asus I/O shield.

17) Watch Intel processor installation video. You will **not** use **Intel-supplied** fan heat sink, backplate, or thermal interface material (grease). You will use better aftermarket products instead.

<http://www.intel.com/support/processors/corei7ee/sb/CS-031463.htm>

18) Unpack Intel processor. *Only touch outer edges of processor.*

19) **Optional expert** step: Use heatsink lapping kit to polish top case of processor to improve heat transfer. Useful for over-clocking; however, voids Intel processor warranty.

20) Remove impurities from top of processor with ArtiClean 1 and 2.

21) Carefully install Intel processor in LGA1366 motherboard socket.

22) **Read Prolimatech heat sink manual, and 'Installation' tab on this page:**

http://www.prolimatech.com/products/cpu_cooler/megahalems_rev.b.html

23) **Optional expert** step: Use heatsink lapping kit to polish base of heatsink to improve heat transfer.

24) Remove impurities from base of heatsink with ArtiClean 1 and 2.

25) Read application method for thermal interface material:

http://www.arcticsilver.com/pdf/appmeth/int/vl/intel_app_method_vertical_line_v1.1.pdf

26) Apply Shin-Etsu thermal interface material to top of processor using vertical line method.

27) Firmly fasten heat sink to motherboard. Orient the two black aluminum strip adapters parallel with the orange memory sockets.

28) Install Nexus **clear** PWM fan onto heat sink, on side nearest orange memory sockets. See step 9 photo on Prolimatech installation web page. Align arrow to blow air into heatsink. Use a fan clip on the four corners. The clips should hold fan tightly – bend them *slightly* if necessary.

29) **Optional** cabling technique: route cables *behind* motherboard for cleaner look.

- 30) Plug heatsink fan cable into CPU_FAN motherboard connector.
- 31) Hold motherboard by heat sinks and place into case aligned with 9 bolt holes. If you have decided to route cables behind motherboard, don't bolt it in yet; otherwise, go ahead.
- 32) Read Seasonic power supply manual.
- 33) Plug Seasonic **Main Power** (20/24 Pin) cable into the **M/B** power supply connectors (top right and bottom right) and into the **EATXPWR** motherboard connector.
- 34) Remove cover from EATX12V motherboard connector. Plug Seasonic **EPS12V** (8 Pin) cable into **CPU** power supply connector (top row, 3rd from left) and into **EATX12V** motherboard connector.
- 35) Plug Seasonic **SATA** power cable into a **Peripheral IDE / SATA** power supply connector (bottom left) and into the **Intel SSD drive**.
- 36) Plug Seasonic **SATA** power cable into a **Peripheral IDE / SATA** power supply connector (bottom row, 3rd from left) and into the **optical drive**.
- 37) Plug 9" yellow SATA data cable into the Intel SSD drive and into the SATA1 motherboard connector. Right-angle end goes into drive, straight end into motherboard.
- 38) Plug 19" yellow SATA data cable into the optical drive and into the SATA3 motherboard connector. Right-angle end goes into drive, straight end into motherboard.
- 39) Plug Nexus *black-and-white* case fan cable into CHA_FAN1 motherboard connector.
- 40) **Optional** step: Use wire cutters to remove 'standard' power connector from case fan wires. Wrap ends in black electrical tape.
- 41) Plug Antec USB cable from case into blue Asus USB Q-connector. Plug Q-connector into USB78 motherboard connector.
- 42) Plug Antec 1394 FireWire cable from case into IE1394_2 motherboard connector.
- 43) Plug Antec **HDA** front panel audio cable from case into AAFP motherboard connector.
- 44) As described in Asus manual, plug Antec system panel wires from case into Asus Q-connector. Plug Q-connector into PANEL motherboard connector.
- 45) Use small black zip ties to secure cables where needed. Secure wires away from fans.

- 46) If you routed cables behind motherboard, now is the time to bolt motherboard into case.
- 47) Insert 3 Corsair memory sticks into **orange** motherboard memory sockets DIMM A1, B1, and C1. Align notch on bottom of memory stick to corresponding bump on socket.
- 48) Align and insert video card into blue **PCIEX16_1** motherboard slot. If available, second and third video cards go into PCIEX16_2 and PCIEX16_3 slots.
- 49) Install side panel on case and tighten thumbscrews.
- 50) Move assembled computer to its final destination.
- 51) Connect monitor DisplayPort cable to monitor and video card. Plug monitor power cable into monitor and UPS. Same for any additional monitors.
- 52) Plug router power cord into UPS.
- 53) Plug internet modem power cord into UPS.
- 54) Plug phone power cord into UPS.
- 55) Plug speaker power cord into surge suppressor. Optionally, you may plug a <250Watt speaker power cord into UPS.
- 56) Connect Belkin 20' PC patch cable into PC LAN connector and into router.
- 57) Connect Belkin 1' router patch cable into network router and into internet modem.
- 58) Connect speaker audio cable into green Audio I/O port on back of PC.
- 59) Read Logitech wireless keyboard and mouse manuals.**
- 60) Setup Logitech wireless keyboard and mouse.
- 61) Plug surge suppressor into 15 Amp **wall socket** (separate from UPS wall socket).
- 62) Plug printer, fax, and any other power cords into surge suppressor (**not UPS**).
- 63) Connect Seasonic power cord into PC's power supply and into UPS.

STEP 3: Setup BIOS

BIOS is the “Basic Input/Output System” and is the first set of instructions that run in firmware to boot up a computer.

These settings are specifically for the **Asus P6T SE** motherboard.

Read Asus manual Chapter 3. (Skim section 3.2. Skip sections 3.5 and 3.9).

Power-on.

Press <Delete> during the Power On Self Test to enter BIOS setup. If you miss it, press Ctrl-Alt-Del to reboot and try again. (May need to use a wired keyboard for this).

From the BIOS setup menu: **Exit | Load Setup Defaults | Exit & Save Changes**

System will reboot.

Press <Delete> during the Power On Self Test to enter BIOS setup.

Make the following changes, keeping all other defaults:

Main menu

If the Intel SSD isn't in SATA 1, power off and reposition SATA data cables.

- **SATA 1: Intel SSD**
 - Storage Configuration
 - SATA Configuration: **[Enhanced]**
 - Configure SATA as: **[AHCI]**
 - AHCI Settings
 - AHCI CD/DVD Boot Time out: **[10]**
 - SATA Port 1, 3: **[Auto]**
 - SATA Port 2, 4, 5, 6: **[Not Installed]**
 - Hard Disk Write Protect: **[Disabled]**
 - IDE Detect Timeout (Sec): **[10]**
 - **SATA 3: Pioneer Blu-ray Drive**
 - **SATA 2, 4, 5, 6: [Not Installed]**

Advanced menu

- Onboard Devices Configuration
 - High Definition Audio: **[Enabled]**
 - Front Panel Type: **[HD Audio]**
 - J-Micron eSATA/PATA Controller: **[Disabled]**

- Realtek LAN: **[Enabled]**
 - LAN Boot ROM: **[Disabled]**
- Onboard 1394 Controller: **[Disabled]**
- USB Configuration
 - USB 2.0 Controller Mode: **[HiSpeed]**
 - Legacy USB support: **[Disabled]**
- PCIPnP
 - Plug and Play O/S: **[Yes]**

Power menu

- Hardware Monitor
 - CPU Q-Fan Control: **[Enabled]**
 - CPU Fan Profile: **[Silent]**
 - Chassis Q-Fan Control: **[Enabled]**
 - Chassis Fan Profile: **[Standard]**
 - Power Fan Speed: **[Ignored]**

Boot menu

- Boot Device Priority
 - 1st Boot Device: **[Intel SSD Hard Drive]**
 - 2nd Boot Device: **[Pioneer Blu-ray Drive]**
 - 3rd Boot Device: **[Removable Dev.]**
- Boot Settings Configuration
 - Quick Boot: **[Enabled]**
 - Full Screen Logo: **[Disabled]**
 - Bootup Num-Lock: **[On]**
 - Wait for 'F1' If Error: **[Enabled]**
 - Hit 'DEL' Message Display: **[Enabled]**

Exit menu

Exit & Save Changes

STEP 4: Install Operating System and Applications

Operating System

- Put Microsoft Windows 7 64-bit Professional disc in optical drive and power cycle PC.
- Install the Windows operating system.
- Update nVidia 64-bit video drivers from nVidia website.
- Desktop setting – Black background, Screen saver, DPI settings (large), etc.
- Set monitor resolution to max for each monitor.
- Set Initial and Maximum page file size equal to the “Recommended” amount. Set restore size to 1%.
- Run Windows Update Express/Custom multiple times.
- Create User account.
- Install Avira AntiVir.
- Install and run Tune-up Utilities to configure security, remove file sharing, setup ClearType, etc.
- Update Asus BIOS only if problems arise.
- **Skip all Asus files.**
- Do **not** load **any** software from the CDs that accompany the hardware. Store all hardware CDs in a drawer, probably never to be used. The Windows 7 installation automatically identifies all your hardware and loads corresponding native Windows drivers.

Applications

- Install Adobe Flash Player.
- Install Adobe Reader.

- If Windows 7 doesn't recognize printer, install latest Windows 7 printer driver from manufacturer's website.
- Install K-Lite Codec Pack Full.
- Install Java 64-bit.
- Install MS Office.
- Run Microsoft Update.
- Install Windows Live Messenger.
- Install 7-Zip.
- Install and configure APC PowerChute. Operational level should be under 400 watts.
- Run Tune-up Utilities to optimize OS (clean startup, disable hibernation).
- Transfer personal files from old PC.
- Transfer browser favorites from old PC.
- Install any other applications required for business purposes.

STEP 5: Setup and Validate Security

Install Comodo firewall

- Start | Control Panel | Security Center | Windows Firewall | Off | OK
- Install Comodo Firewall. Run all programs. Accept all pending files from Comodo. Add Signatures.
- Disable Comodo Defense+ mode

Lockdown operating system

- Install latest service packs.
- Enable Windows Update. Set a weekly time outside of business hours.
- Disable file and printer sharing. Remove extra user accounts.
- Do not install peer-to-peer network services (eMule, eDonkey, Kazaa, PalTalk, etc)
- Setup Java control panel to automatically update.

Install anti-virus

- Download Avira AntiVir.
- Uninstall any existing anti-virus before installing new one.
- Install Avira AntiVir.
- Configure program to automatically update virus signatures everyday at a specific time outside business hours.
- Configure program to automatically scan for viruses every Friday at a specific time outside business hours.

Install spyware prevention

- Download and install SpywareBlaster

<http://www.javacoolsoftware.com/sbdownload.html>

- Schedule a task to update spyware prevention every Friday at a specific time outside business hours.

Validate operating system security

- Download and run Microsoft Baseline Security Analyzer

http://www.microsoft.com/downloads/en/results.aspx?freetext=Microsoft+Baseline+Security+Analyzer+2.1.1&displaylang=en&stye=s_basic

Validate internet security

- Run Shields UP from Gibson Research Corp website

<https://www.grc.com/x/ne.dll?bh0bkyd2>

STEP 6: Schedule Automated Maintenance

Refresh restore points

- Delete any prior restore points. (C: | Properties | Disk Cleanup | More Options)
- Create a fresh restore point.

Clean and compact registry

- Download and install Tune-Up Utilities
<http://www.tune-up.com/>
- Schedule a task to automatically clean registry every Friday at a specific time outside business hours.

Defragment any non-SSD hard drives

- Download and install PerfectDisk
<http://www.raxco.com>
- Configure program to automatically update PerfectDisk software Friday at a specific time outside business hours.
- Schedule a task to automatically defrag hard drive every Friday at a specific time outside business hours.

STEP 7: Conduct Stress Test

- Reboot.
- Download Core Temp for 64 bit
<http://www.alcpu.com/CoreTemp/index.html>
- Download Prime95 for Windows 64-bit
<http://www.mersenne.org/freesoft/#newusers>
- Run Core Temp.
- Before you start the test, take a screen shot (Alt+PrtScr) of Core Temp and save it in Paint.
- Run Prime95.
- Select Torture test.
- Specify Small FFTs (instead of Blend).
- Specify 8 threads for quad core or 12 threads for six core processor.
- Just before you stop the test, take a screen shot of Core Temp and save it in Paint.
- Stop test after 20 minutes.

At 100% load, the High temp of the hottest core should be under 79C. (Tjunction max - 20).

Typically, the Ultimate Professional Computer's hottest core at 100% load is under 73C, but anything under 79C is safe. The ambient temperature of the room has an effect.

- Power off PC nightly for two weeks. Heat cycling cures the thermal interface material.

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